



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/656,453

09/05/2003

Yuan Wu

03-SIN-092

8429

7590
Lisa K. Jorgenson, Esq.
STMicroelectronics, Inc.
1310 Electronics Drive
Carrollton, TX 75006

06/22/2009

EXAMINER

PAUL, DISLER

ART UNIT

PAPER NUMBER

2614

MAIL DATE

DELIVERY MODE

06/22/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/656,453	Applicant(s) WU ET AL.	
	Examiner DISLER PAUL	Art Unit 2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-9; 11;-27;30-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-6; 8-9;11-27 is/are allowed.
- 6) ☒ Claim(s) 7;30-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

As in regard to the last office action mailed on 2/2/09 claims 2-6; 8-9; 11; 13-26 remained allowed.

Furthermore, in regard to claim 27, the applicant's argument is found persuasive and upon further analysis claims 27 is now allowed (see reason for allowance).

Furthermore, the applicant's amended claim (7, 32) have been further considered and is rejected over new prior art.

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Allowable Subject Matter

2. Claims 2-6; 8-9; 11; 13-27 are allowed.

RE claim 2, while, the prior art of record disclose of the audio processor, comprising:
a virtualizer configured to process audio information to virtualize at least one speaker so that, from a listener's perspective, sounds appear to come from at least one direction where a physical speaker is not present; and a controller configured to cause the virtualizer to virtualize the at least one speaker at any location in a space around the listener, and feedback and feed-forward filters.

But, none of the prior art of record disclose of the specific wherein the virtualizer comprises: a filter configured to filter input signals comprising the audio information; a forward crossover path operable configured to receive, delay, and filter an output of the filter; a first combiner configured to produce first output signals for a first physical speaker using the output of the filter; a second combiner configured to produce second output signals for a second physical speaker using an output of the forward crossover path a first feedback crossover path configured to receive, delay, and filter the first output signals, the second combiner further configured to produce the second output signals using an output of the first feedback crossover path; and a second feedback crossover path configured to receive, delay, and filter the second output signals, the first

Art Unit: 2614

combiner further configured to produce the first output signals using an output of the second feedback crossover path.

Similarly, Re claim independent claims 3, 11, 18 have been analyzed and allowed for same reason as in claim 2.

Similarly, Re claim 8 while, the prior art disclosed of having a virtualizer operable to process audio information to virtualize at least one speaker so that, from a listener's perspective, sounds appear to come from at least one direction where a physical speaker is not present; a controller operable to configure the virtualizer, wherein the virtualizer can be configured to virtualize the at least one speaker at any location in a space around the listener and the virtualizer comprises at least one first filter and one or more forward crossover paths each comprising a first delay line and a second filter, and two feedback crossover paths each comprising a second delay line and a third filter.

But, none of the prior art of record disclose of the specific wherein at the first filter and second filter with the particular frequency as being noted in therein and further at least one first delay line provides a delay D of $D = t(\sim b) - t(F)$, and at least one second delay line provides a delay D_r of $D_r = t(O) - t(F_r)$, wherein 0 represents an angle associated with at least one physical speaker, q_5 represents an angle associated with at least one virtualized speaker, 1 , represents a transfer function associated with one of the listener's ears, H_c represents a transfer function associated with another of the

Art Unit: 2614

listener's ears, $t(4\sim)$ represents an inter-time difference associated with the at least one virtualized speaker, $t(O)$ represents an inter-time difference associated with the at least one physical speaker, $t(F)$ represents a delay associated with at least one second filter, and $t(Fr)$ represents a delay associated with at least one third filter.

Similarly, Re claim independent claim 9 has been analyzed and allowed for same reason as in claim 8.

Similarly, Re claim 27, while, the prior art of record disclose of generating first output signals for a first physical speaker; generating second output signals for a second physical speaker; filtering one or more input signals to produce one or more filtered input signals; providing one or more of the filtered input signals to one or more forward crossover paths; and generating the first and second output signals using one or more of: one or more of the input signals, one or more of the filtered input signals, and one or more outputs from the forward crossover paths; and feed-back path and wherein the first output signals emulate effects of a virtual speaker on one ear of a listener, the second output signals emulate effects of the virtual speaker on another ear of the listener, and each of the output signals at least partially cancels crosstalk caused by the other output signals.

But, none of the prior art of record disclose of the specific wherein providing the second output signals to a first feedback crossover path operable to receive, delay, and filter the second output signals; an providing the first output signals to a second feedback crossover path operable to receive, delay, and filter the first output signals; wherein generating the first output signals further comprises using an output from the second feedback crossover path; wherein generating the second output signals further comprises using an output from the first feedback crossover path.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumamoto (US 6,285,766 B1) and Kasai et al. (US 7,242,782 B1).

Re claim 7, Kumamoto disclose of an audio processor, comprising: a virtualizer configured to process audio information to virtualize at least one speaker so that, from a listener's perspective, sounds appear to come from at least one direction where a physical speaker is not present; a controller configured to cause the virtualizer to virtualize the at least one speaker at any location in a space around the listener;(col.1

Art Unit: 2614

line 15-30; col.17 line 30-45/controller to cause virtual of speakers in any position around listener to create sound localizations) and the virtualizer comprises at least one first filter, one or more forward crossover paths each comprising a first delay line and a second filter, and two feedback crossover paths each comprising a second delay line and a third filter (fig.5 (215,208,206); col.16 line 35-55/ explicitly having the filters and feedback and forward to enable virtualization of the speaker and inherently delay for each filters since transfer functions would require such delay (col.1 line 60-67; col.2 line 10-16) for the filter having the feed-back and forward path) , the controller causes the virtualizer to virtualize the at least one speaker (col.12 line 1-35; col.12 line 1-10; fig.6-8/speaker virtualized as required).

However, Kumamoto fail to disclose of the specific wherein the virtualizing the loudspeakers by individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines. But, Kasai disclose of a virtualization wherein the virtualizing the loudspeakers by individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines (fig.19 (120a, 1208); col.12 line 37-44/each of the filter being individually alter the frequency response and a delay line is being adjusted as in compensation in creating the surround sound speaker image). Thus, it would have been obvious for one of the ordinary skill in the art to have modified the combination with having such virtualizing the loudspeakers by individually altering a frequency response of one or more of the filters and a delay of one or more of the delay lines for improving the accuracy and sound image.

Re claim 32, the method comprising: generating first output signals for a first physical speaker and generating second output signals for a second physical speaker; and wherein the first and second output signals are produced using one or more first filters, one or more forward crossover paths each comprising a first delay line and second filter, and two feedback crossover paths each comprising a second delay line and a third filter; and individually altering a delay of one or more of the delay lines to change the location of one or more of the virtualized speakers (see claim 7 rejection analysis).

5. Claims 30- 31 are rejected under 35 U.S.C. 103(a) as being unpatentable by Kumamoto (US 6,285,766 B1) and Kasai et al. (US 7,242,782 B1) and Kawano (US 6,804,358 B1).

Re claim 31, the method of claim 32 with virtual sounds (col.21 line 5-20/create sound at multiple around with the two output signals speakers), but, the combined teaching of Kumamoto et al. and Kasai et al. as a whole, fail to disclose of the specific wherein the first and second output signals emulate the effects of multiple virtual speakers at any locations in a space around the listeners. But, kawano disclose of a system wherein similar concept of having multiple virtual speakers at any locations in a space around the listeners with the first and second output

Art Unit: 2614

signals (fig.1,6; col.3 line 30-46). Thus, it would have been obvious for one of the ordinary skill in the art to have modified the combination by having multiple virtual speakers at any locations in a space around the listeners with the first and second output signals for purpose of creating a theater sound effect for optimum sound experience.

Re claim 30 has been analyzed and rejected with respect to claim 31.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DISLER PAUL whose telephone number is (571)270-1187. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2614

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. P./
Examiner, Art Unit 2614

/Vivian Chin/
Supervisory Patent Examiner, Art Unit 2614